



U.S. Army Corps
of Engineers
North Central Division

GREAT LAKES LEVELS

Update Letter No. 69 3 April 1991

LAKE SURVEY HISTORY PUBLISHED

Great news for those who are interested in Great Lakes history! The U.S. Lake Survey District history is being published and will be available by April 24, 1991. The document describes the origin of the Lake Survey District and its original mission to map the Great Lakes. The text continues with the evolution of the Lake Survey and ends with the reorganization which resulted in its demise. The 300-page history contains nearly 100 photographs gleaned from the Lake Survey archives.

In honor of this occasion, two events are planned:

- A dedication by Brigadier General Jude W. P. Patin, Commanding General, North Central Division, at the Dossin Museum in Detroit, Michigan, on April 24, 1991. The dedication is scheduled for 1:00 p.m., and is open to all.

- A Lake Survey Alumni reunion and dinner for former employees will celebrate this long awaited event. This is scheduled for the evening of April 23. The event will be held at Vladimir's Restaurant in Farmington Hills, Michigan, 28125 Grand River, located at the corner of Grand River and Eight Mile Roads, starting at about 7:00 p.m. For more details, contact Mr. Benjamin G. DeCooke at (313) 226-6440.

The U.S. Lake Survey District, U.S. Army Corps of Engineers, was established in the Great Lakes area in 1841, to undertake "a hydrographic survey of the northern and northwestern lakes." The role and responsibility of the Lake Survey grew as conditions on the Great Lakes changed over the following 135 years. With the first large influx of settlers came the need for extensive surveys and the

production of the first accurate navigational charts for the Great Lakes region. In order for passenger and freight carrying vessels to travel in greater safety, there was a need to locate and identify hidden reefs and shoals. As Great Lakes ships evolved into larger vessels with greater drafts, new and more accurate surveys and charts were required. To meet this demand required developing new and more sophisticated methods

of chart production. In modern times, as the number of recreational craft expanded, a program was initiated for the design and publication of large scale book charts.

The need to determine the velocity and quantity of flow in the Great Lakes connecting channels led the Lake Survey to develop the first electronic current meters. These meters were the prototype of the meters in use today. Flows in the con-



Figure 1

COL JOHN J. ABERT, CHIEF, CORPS of Topographical Engineers, 1838-1861.
The survey of the Great Lakes began under his direction.

necting channels were first measured by the Lake Survey in 1867. The Lake Survey continued to make periodic flow measurements, until this function was given to the Detroit District, U.S. Army Corps of Engineers, in 1976.

The first systematic recording of Great Lakes water levels was begun by the Lake Survey in 1859. The first detailed tables of Great Lakes water levels appeared in Captain George Meade's annual report for 1860. (Captain Meade, Commander of the Lake Survey from 1857 to 1861, went on to become General Meade of Civil War fame.) Many of the first recording devices for measuring lake levels were developed at the Lake Survey.

The Lake Survey District was originally a part of the U.S. Army Corps of Topographical Engineers of the U.S. Army. The Civil War brought sweeping changes to the Army's organization, and in 1863, the Corps of Topographical Engineers was merged into the U.S. Army Corps of Engineers. Under the U.S. Army Corps of Engineers, the major responsibilities of the Lake Survey were to chart the Great Lakes and to collect, disseminate, and investigate Great Lakes water levels.

In order to make predictions of future Great Lakes water levels, special forecasting techniques were developed in 1952. These forecasts were disseminated in a bulletin which was the forerunner of the present Monthly Bulletin of Lake Levels for the Great Lakes. The Lake Survey also provided technical consulting services to the International Joint Commission. This included the development of the first plans for the regulation of Lake Superior and Lake Ontario. Lake Survey participated in the re-evaluation of the International Great Lakes Datum (1955), and in studies of crustal movement in the Great Lakes. The mission to conduct oceanographic research of Great Lakes waters was assigned in the early 1960s.

For many decades the Lake Survey operated its own fleet of charting and survey vessels. In the 1950s, the function of servicing and maintaining the fleet was transferred to the Detroit District, U.S. Army Corps of Engineers.

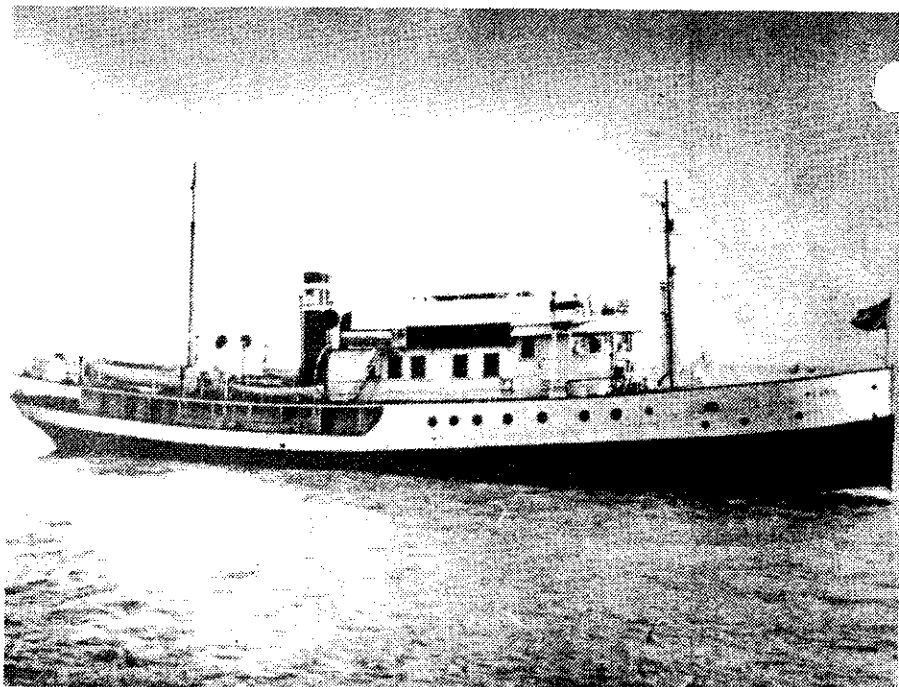


Figure 2

The Lake Survey vessel "Peary" (steamer).

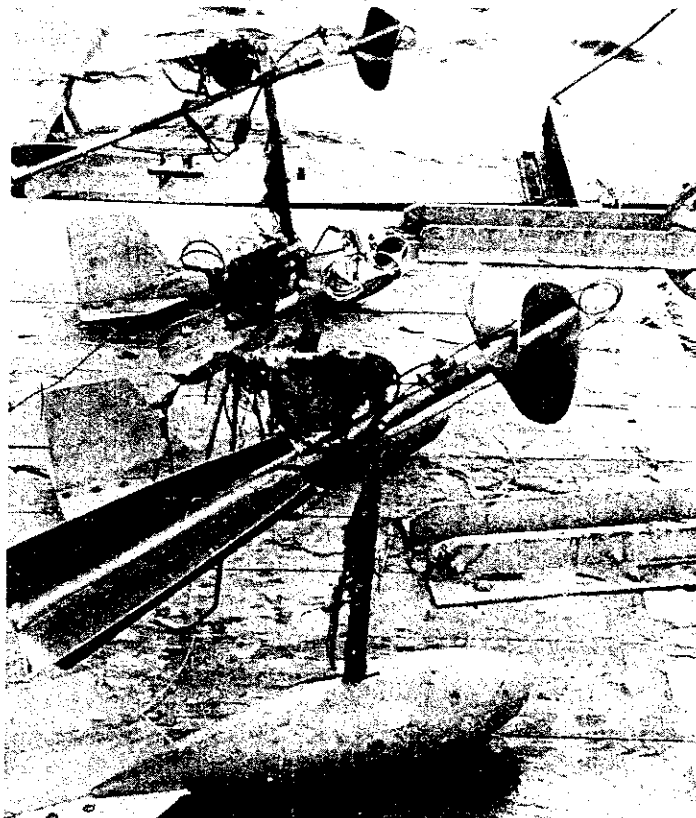


Figure 3

Three different types of flow meters used on the St. Lawrence River in June 1953 (from foreground: Haskell, Price, and Gettner), shown after removal from water on a day when weeds were floating downstream.

Because of the Lake Survey's extensive capabilities in map compilation and printing, its Cartographic Division produced many maps from around the world, beginning during World War II and continuing through the Korean War. This function was transferred to the Army Map Service in 1969.

On July 9, 1970, the President submitted "Reorganization Plan No. 4 of 1970" to Congress. The plan established the National Oceanic and Atmospheric Administration (NOAA) as part of the Department of Commerce and brought together, in a single agency, the major federal programs dealing with the seas and atmosphere. On October 3, 1970, the Lake Survey was redesignated the Lake Survey Center and was officially transferred to NOAA.

Under the reorganization which created NOAA, certain Lake Survey elements stayed with the Corps. The Lake regulation and hydraulic branches of the Engineering Division, which measured and computed river flows, prepared lake level forecasts, and provided support to international boards, were transferred to the Detroit District, U.S. Army Corps of Engineers. The Coastal Engineering Research Center of the Corps of Engineers at Fort Belvoir, Virginia, at that time received the Shore Processes Branch, concerned with Great Lakes coastal research.

As a NOAA unit, the Lake Survey Center continued its activities involving water levels research, water motion, water characteristics, and ice and snow; the printing and distribution of navigational charts; and publication of the Great Lakes Pilot.

In 1974, organizational changes within NOAA resulted in the transfer of several Lake Survey Center activities. In April 1974, the Great Lakes Environmental Research Laboratory, established in Ann Arbor, Michigan, was assigned responsibility for Great Lakes limnological and research operations. In July 1974, the National Ocean Survey in Rockville, Maryland, received responsibility for compiling, printing, and mail distribution of Great Lakes charts. The Lake Survey Center continued to conduct charting and water level collection of the Great Lakes and their outflow rivers. It also provided engineering support to the



Figure 4

Preparation of lake charts by Lake Survey personnel.

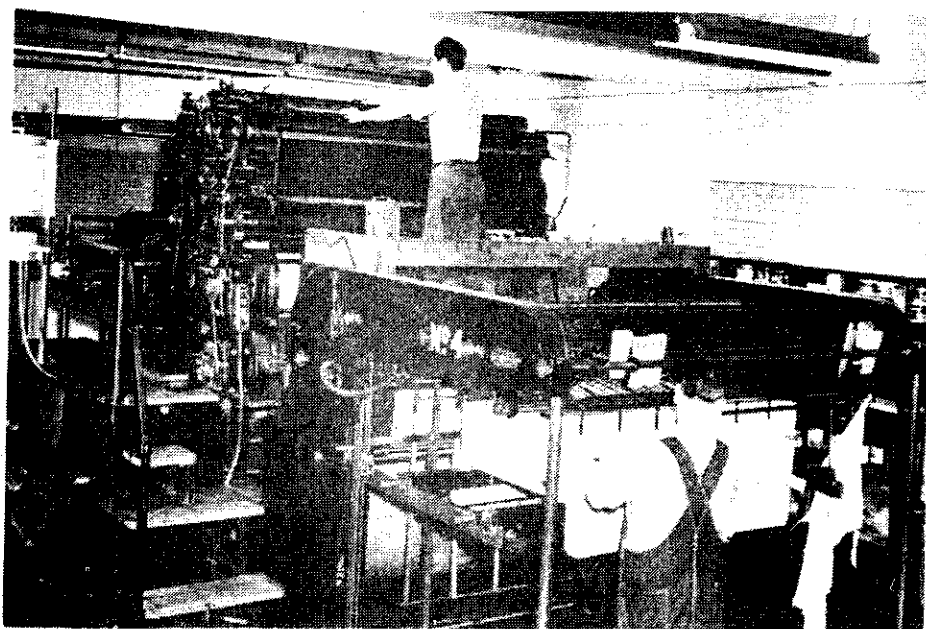


Figure 5

Printing of lake charts by Lake Survey personnel.

Corps and various other state, regional, Federal, and international organizations.

In addition, the Center's Engineering Division moved to Monroe, Michigan, where it became a NOAA marine base. This new facility handled ship and logistics work for three vessels which conducted hydrographic and research activities not only for the Lake Survey Center, but also for the Great Lakes Environmental Research Laboratory. The facility also provided and serviced the Center's instruments, laboratories, and electronic and automotive equipment.

On March 1, 1976, the National Ocean Survey office in Rockville, Maryland, assumed all functions pertaining to the compilation, publication and distribution of the Great Lakes Pilot. Three months later, the Department of Commerce issued the following special announcement: "The Lake Survey Center, formerly the U.S. Lake Survey under the Corps of Engineers, is being phased out... after 135 years on the Great Lakes. You are directed to the following offices for Great Lakes information:

Charts

National Ocean Survey
Riverdale, Maryland

Water Level Data

National Ocean Survey,
Rockville, Maryland

Monthly Bulletin of Lake Levels

U.S. Army Engineer District
Detroit, Michigan

Geodetic Information (Horizontal and Vertical Control)

National Geodetic Survey,
Rockville, Maryland

Research Information Activities

Great Lakes Environmental
Research Laboratory, Ann Arbor
Michigan

Charting and General Information National Ocean Survey, Rockville Maryland.

With this announcement, dated June 30, 1976, the Lake Survey closed its doors for the last time.

The passing of the U.S. Lake Survey concluded an important chapter in the history of the Great Lakes. Here are recalled the stories of explorers and missionaries, French trappers and English traders, immigrants and travelers, shipbuilders and sailors, and daring men and women of courage and adventure. Here also are recalled the stories of surveyors, engineers, technicians, clerks, scientists, and lithographers. These men and women often worked long hours, experienced hardships and privations in their travels, and brought leadership, foresight, and knowledge to the solution of complex matters on the Great Lakes.

Three hundred years ago, while aboard LaSalle's Griffon as it sailed up the Detroit River and on into Lake St. Clair, Father Louis Hennepin wrote: "Those who shall be so happy as to inhabit that noble country cannot but remember with gratitude those who discovered the way by venturing to sail upon unknown lakes."

He was writing of the early French explorers. The words just as easily could have been written about the men and women of the United States Lake Survey who continued to explore, chart and study the Great Lakes.

LAKE LEVELS

Lake Superior was about 5 inches below average in March, while Lakes Michigan-Huron were about 1.5 inches below average for the month. Lakes St. Clair, Erie, and Ontario were about 15, 17, and 16 inches, respectively, above their March averages. Lake Superior followed its downward seasonal trend. Rising seasonal trends were seen in Lakes Michigan-Huron, St. Clair, Erie, and Ontario.

PRECIPITATION

The Great Lakes basin received above average precipitation (see Table 1) and temperatures in March. Precipitation during the past 12 months (April 1990 through March 1991) has totaled 18 percent above average. The National Weather Service is forecasting average precipitation for the Great Lakes basin in April. Temperatures are expected to be above-average in April.

REGULATION

March's Lake Superior outflow was in accordance with Plan 1977-A at a rate of 55,000 cubic feet per second (cfs). April's outflow will be at a rate of about 68,000 cfs.

Lake Ontario's outflow was increased to 325,000 cfs in mid-March in order to reduce the probability of exceeding the Criterion (h) level of 246.77 feet. This action was also taken in order to prepare for outflow reductions when the Ottawa River's freshet reaches the Montreal area. This is expected to occur in April.

Table 1 Great Lakes Basin Precipitation

BASIN	MARCH				YEAR-TO-DATE			
	1991*	AVERAGE**	DIFF.	% OF AVERAGE	1991*	AVERAGE**	DIFF.	% OF AVERAGE
Superior	2.5	1.7	0.8	147	5.3	5.0	0.3	106
Michigan-Huron	3.6	2.2	1.4	164	6.1	5.9	0.2	103
Erie	3.1	2.7	0.4	115	6.7	7.2	-0.5	93
Ontario	4.5	2.6	1.9	173	8.3	7.7	0.6	108
Great Lakes	3.3	2.2	1.1	150	6.2	6.0	0.2	103

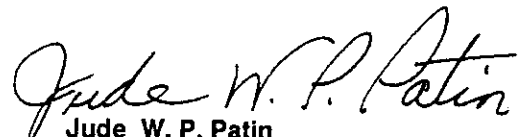
* Estimated (inches)

** 1990-1989 (inches)

ICE BOOM OPERATIONS

Lake Erie - Niagara River Ice Boom operations began on March 26 to remove the ice boom. Operations were suspended on March 28, due to high winds and on March 29 for the Good Friday holiday.

The last spans of the boom were removed on March 30.


Jude W. P. Patin
Brigadier General, U.S. Army
Commander and Division Engineer

For Great Lakes basin technical assistance or information, please contact one of the

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